

Listing of Claims:

1. (Currently Amended) A compact chemical reactor comprising:

a first substrate ~~having~~ including a first surface and a groove formed ~~therein~~ in the first surface;

5 a catalyst layer which is provided on an inner surface of the groove formed in the first surface of the first substrate, and which has a protrusion protruding outward from the first surface of the first substrate; and

10 a second substrate ~~having~~ including a surface which contacts the first surface of the first substrate, and a concave portion formed in the surface of the second substrate to receive a portion the protrusion of the catalyst layer such that the second substrate contacts the first surface of the first substrate so as not to contact the protrusion.

2. (Currently Amended) The compact chemical reactor according to claim 1, wherein a width of the concave portion is set to be at least 105% ~~or more~~ larger than of a width of the groove.

3. (Currently Amended) The compact chemical reactor according to claim 1, wherein the first substrate ~~has~~ comprises a silicon substrate.

4. (Currently Amended) The compact chemical reactor according to claim 1, wherein the second substrate ~~has~~ comprises a glass substrate.

5. (Original) The compact chemical reactor according to claim 1, wherein the first substrate and the second substrate are anode-connected.

Claims 6-7 (Canceled).

8. (Original) The compact chemical reactor according to claim 1, wherein a flow path is formed in a space defined by the groove of the first substrate and the concave portion of the second substrate.

9. (Original) The compact chemical reactor according to claim 8, wherein the flow path is configured to allow a material containing hydrogen to flow as a fluid.

10. (Currently Amended) The compact chemical reactor according to claim 8, wherein the catalyst layer has a catalytic action which causes a chemical reaction to occur in ~~the~~ a fluid flowing into the flow path.

11. (Currently Amended) The compact chemical reactor according to claim 1, wherein a heat generation ~~means~~ member is provided on a second surface of the first substrate, ~~the second surface opposing~~ that is opposite to the first surface.

12. (Currently Amended) The compact chemical reactor according to claim 11, wherein the heat generation ~~means~~ has a member comprises an electrically resistive element.

13. (Currently Amended) The compact chemical reactor according to claim 11, wherein the heat generation ~~means~~ member heats by burning.

14. (Currently Amended) The compact chemical reactor according to claim 13, wherein the heat generation ~~means~~ member includes a groove ~~whose surface is~~ formed in the second surface of the first substrate, a catalyst layer for burning provided in the groove ~~of~~ in the second surface, and a third substrate for burning having a concave portion to receive a portion of the catalyst layer for burning.

15. (Currently Amended) A compact chemical reactor system ~~comprises~~ comprising a plurality of compact chemical reactors, ~~having~~ wherein each of the compact chemical reactors comprises:

5 a first substrate including a first surface and a groove formed in the first surface;

 a catalyst layer which is provided on an inner surface of a the groove formed in a the first surface of the first substrate, and which has a protrusion protruding outward from the first surface of the first substrate; and

10 a second substrate, in which a concave portion to receive the protrusion a portion of the catalyst layer is formed in a surface opposite to the first surface of the first substrate, and which contacts the first surface of the first substrate ~~on the~~ opposite surface so as not to contact the protrusion,

15 wherein at least some of the plurality of compact chemical reactors are arranged so that ~~their~~ the respective grooves thereof are coupled to each other.

16. (Currently Amended) The compact chemical reactor system according to claim 15, wherein each of the compact chemical reactors ~~has~~ comprises one of a reforming reaction section, an aqueous shift reaction section and a selective oxidative reaction section.

17. (Original) The compact chemical reactor system according to claim 15, wherein the plurality of compact chemical

reactors are configured by accumulating the compact chemical reactors.

18. (Currently Amended) The compact chemical reactor system according to claim 15, wherein the plurality of compact chemical reactors ~~have~~ comprise heat generation ~~means~~ members.

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19. (Currently Amended) The compact chemical reactor system according to claim 15, ~~which~~ wherein each of the compact chemical reactors further comprises a heat generation ~~means~~ including ~~member which includes~~ a groove ~~whose surface is~~ formed in the second surface of the first substrate of the first substrate that is opposite to the first surface, a catalyst layer for burning provided in the groove ~~of~~ in the second surface, and a third substrate for burning having a concave portion to receive a portion of the catalyst layer for burning.

20. (Currently Amended) A compact chemical reactor system comprising:

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(a) a compact chemical reactor which includes:

a first substrate including a first surface and a

groove formed in the first surface;

a catalyst layer which is provided on an inner surface of ~~a~~ the groove formed in ~~a~~ the first surface of the first

substrate, and which has a protrusion protruding outward from the first surface of the first substrate; and

10 a second substrate, in which a concave portion to receive a portion the protrusion of the catalyst layer is formed in a surface opposite to the first surface of the first substrate, and which contacts the first surface of the first substrate on the opposite surface so as not to contact the protrusion, and

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(b) a power generation ~~means~~ section which generates electricity ~~with~~ using a reformed material produced by a reaction in the compact chemical reactor.

21. (Currently Amended) The compact chemical reactor system according to claim 20, wherein the compact chemical reactor system comprises a plurality of the compact chemical reactors, and each of the plurality of compact chemical reactors ~~has~~ comprises one of a reforming reaction section, an aqueous shift reaction section and a selective oxidative reaction section.

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22. (Currently Amended) The compact chemical reactor system according to claim 20, wherein the power generation ~~means~~ has section comprises a fuel cell.